Appendix C

Tetra Tech's Summary of Test Pit Investigations

TETRA TECH

November 13, 2007
T19602-22
Tetra Tech Project No. 112C01017

Mr. Paul Welsh
HAZMAT Coordinator
Delaware Department of Transportation
800 Bay Road
P.O. Box 778
Dover, Delaware 19903

Dear Mr. Welsh:

Subject: ***Summary of Test Pit Environmental Site Investigation Field Activities in Support of DelDOT's Bridge 1-503 on St. Anne's Church Road Project, Middletown, Delaware; DelDOT Contract No. 25-071-01***

This letter report summarizes the procedures and findings of the Phase II Environmental Investigation performed in support of DelDOT's Bridge 1-503 Replacement Project, Middletown, Delaware (Figure 1). This Phase II Environmental Investigation included excavating multiple test pits in the area of the proposed storm water retention pond. The goal of the test pitting work was to help further delineate the lateral and vertical extent of fill material in the wooded area located on the western portion of the former Middletown Landfill site. Due to the heavy vegetation found currently existing on this section of the property, no data was collected from the location where the proposed storm water retention pond is to be constructed, during the geophysical survey previously performed at the site.

TEST PIT EXCAVATION PROCEDURE

Tetra Tech subcontracted with Lewis Environmental Group to provide a track excavator and operator to install the test pits at locations specified by Tetra Tech's supervising environmental scientist at the site. A total of 17 test pits was dug at the site on October 23 and 24, 2007 (Figure 2). The location of these test pits were placed to either complete a basic grid pattern sampling scheme for the subject property or biased to any observed visual cues of historical dumping locations on the subject property. The locations of the test pits were surveyed by the supervising Tetra Tech environmental scientist using a Trimble Geo-Explorer 3 Global Positioning System with a 1-meter resolution. A summary of the coordinates for the test pit locations based on the Geographic Coordinate Systems 1984 World Geodetic Survey are included in Table 1.

The depth of each test pit varied from 2 to 16 feet below ground surface, based on visual observations of the supervising environmental scientist in the field. These visual observations were focused on identifying the presence of any fill material within each test pit location. The location, thickness, and depth of any fill material observed were recorded, along with all pertinent information regarding the interface between the fill materials and the native soils. Once native soils were observed in each of the 17 test pits, further excavation was halted to limit any cross-contamination of the shallow fill materials to deeper, native soils. No soil samples were collected for laboratory analyses at any of the test pit locations.

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OBSERVATIONS AND LANDFILL DELINEATION

Copies of Tetra Tech's test pit logs are included with this letter report. Landfill material consisting of ash, broken glass bottles, terra-cotta pipe, and pieces of brick, was encountered at test pit locations TP-1, TP-3, TP-10, TP-11, TP-12, and TP-16 at depths of 0.5 to 1 foot below existing grade and at thicknesses ranging from 2 to 4.5 feet. The landfill material also appears to extend to the northwest into the wetland area adjacent to Deep Creek. No test pits were dug in the wetland area during this investigation.

The first native soil layer encountered consisted of orange, tan, and light brown, fine to medium grained sand with some gravel.

Based on the results of this field investigation, Tetra Tech was able to generate a map showing the approximate extent of landfill area at the site (Figure 3). Due to undetermined extent of landfill material along the northwestern section of the property, Tetra Tech cannot accurately estimate the volume of landfill material currently found on the DelDOT property.

CONCLUSIONS

This environmental site investigation confirmed the existence of landfill material on the subject DelDOT property where the proposed storm water retention pond is to be constructed. This landfill material was encountered at approximately 0.5 to 1 foot below the existing grade and 2 to 4.5 feet thick. The landfill material also appears to extend to the northwest into the wetland area adjacent to Deep Creek.

Sincerely,

Jason Daliessio
Geologist

Christopher Geiger, P.G.
Project Manager

jp
Enclosures

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Source: Roads from DelDOT; Tax Parcel from New Castle Co.; Topo from USGS DLGs; USGS State and County Boundaries from National Atlas (nationalatlas.gov).

0 5 10 20 30 40
Miles

1:2,877,900

Legend

Subject parcel

N
W
E
S

Figure 1
General Location
St. Annes Church Road/Bridge I-503 DelDOT Site
Middletown, New Castle County, DE

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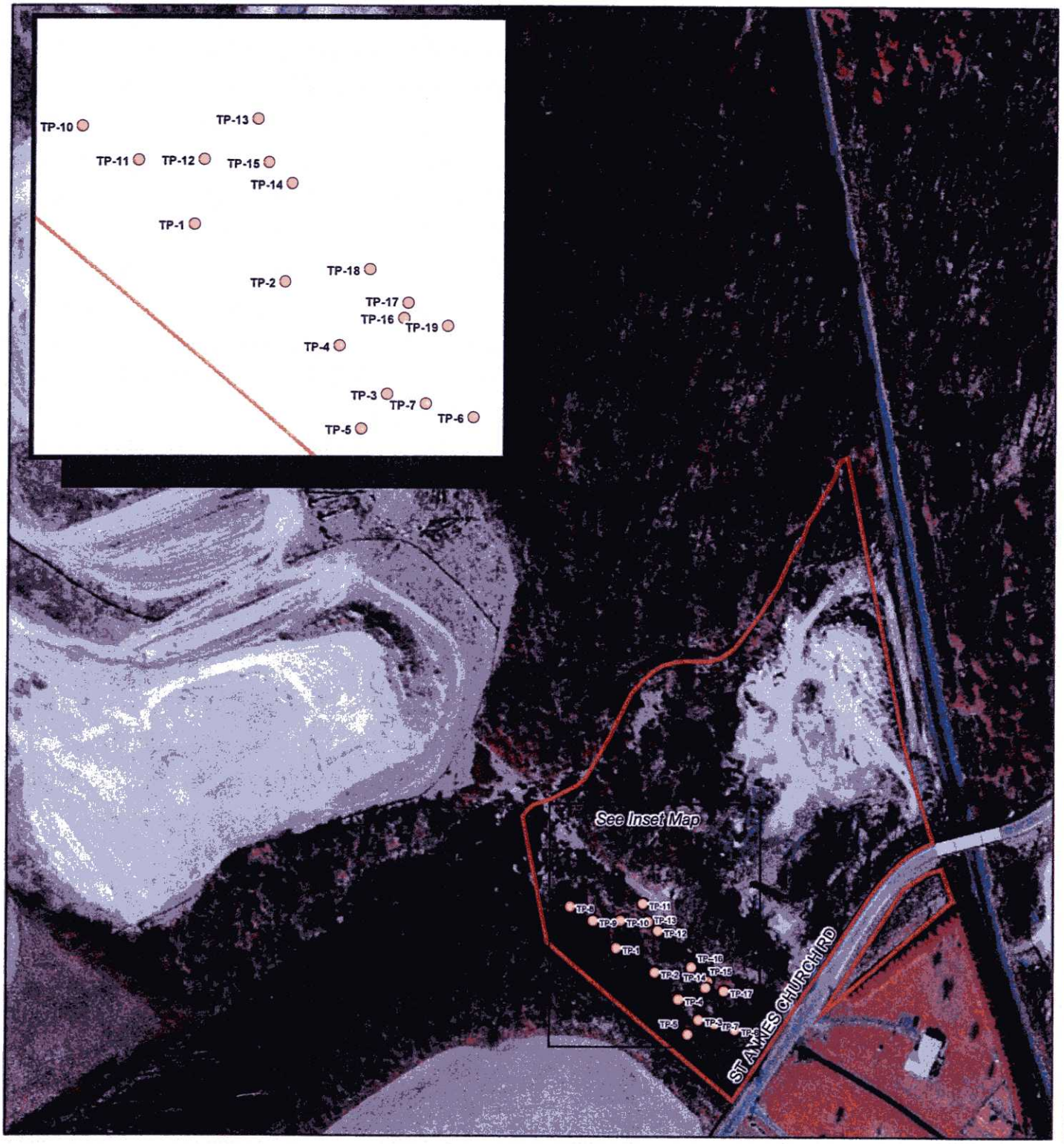

Source: Roads from DelDOT; Tax Parcel from New Castle Co.; Topo from USGS DLGs; USGS State and County Boundaries from National Atlas (nationalatlas.gov).

Legend
- Subject parcel
- Test Pit Location

037.575 150 225 300
Feet
1:1,060

Figure 2
Test Pit Location
St. Annes Church Road/Bridge I-503 DelDOT Site
Middletown, New Castle County, DE

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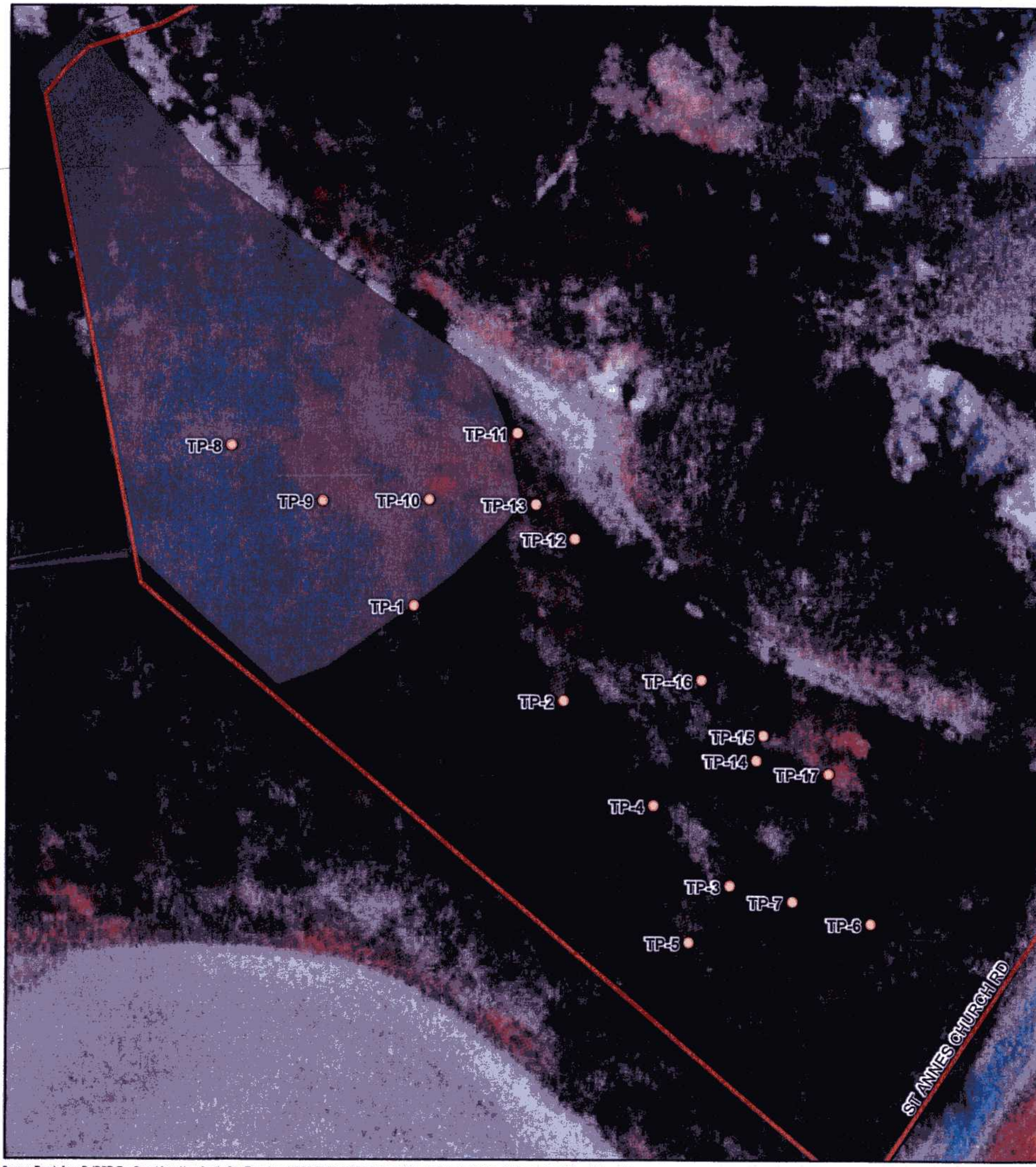
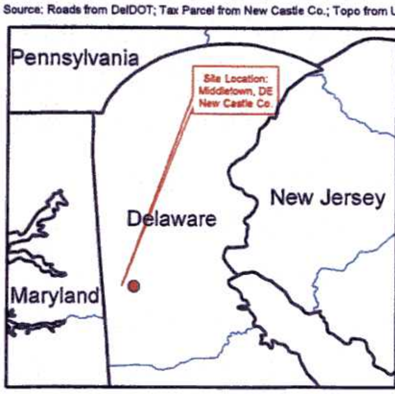
CAA N:\Projects\T0000001\14000\T14777_707_S_Market\Data\GIS\Fig1_SiteLocationMap.mxd



Source: Roads from DelDOT; Tax Parcel from New Castle Co.; Topo from USGS DLGs; USGS State and County Boundaries from National Atlas (nationalatlas.gov).



0 10 20 40 60 80 Feet

1:10,000

Legend

- Subject parcel
- Test Pit Location
- Fill Material (Estimated)

Figure 3
Estimated Location of Fill Materal
St. Annes Church Road/Bridge I-503 DelDOT Site
Middletown, New Castle County, DE

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TETRA TECH - TEST PIT LOG

Project Name: St. Annes Church Road/Bridge I-503		Project No.:112C01017
Project Location:Middletown, Delaware		
Test Pit No.:1	Date Excavated: 10/23/2007	Inspector: Jason Daliessio
Contractor:Lewis Environmental	Excavation Method: Track Excavator	
Surface Elevation (ft):Unknown	Groundwater Depth (ft): 8	Total Depth (ft): 10

		PID readings		Strata Depth (ft)			
Sample	Sample Depth (ft)	Depth (ft)	PPM	From	To	Description of Materials	Moisture
				0.0	0.5	Light brown silty sand with moderate pebble content and fill material (glass, brick)	D
				0.5	3.5	Fill material (ash, glass bottles, terra-cotta pipe)	D
				3.5	9.0	Orange to light brown medium-grained sand, clean, native	M
				9.0	10.0	Yellow to orange fine grained sand with moderate rounded coarse gravels	S
				10.0		End of boring	

Notes and comments Moisture codes: D-dry, M-moist, W-wet, S-saturated

Groundwater observed at approximately 8' below ground surface.

To limit cross-contamination with shallower fill material, deeper native soils were not disturbed during the test pit investigation.

Samples Collected

Time	Designation	Time	Designation

TETRA TECH - TEST PIT LOG

Project Name: St. Annes Church Road/Bridge I-503		Project No.:112C01017
Project Location:Middletown, Delaware		
Test Pit No.:2	Date Excavated: 10/23/2007	Inspector: Jason Daliessio
Contractor:Lewis Environmental	Excavation Method: Track Excavator	
Surface Elevation (ft): Unknown	Groundwater Depth (ft):	Total Depth (ft):2

		PID readings		Strata Depth (ft)			
Sample	Sample Depth (ft)	Depth (ft)	PPM	From	To	**Description of Materials**	Moisture
				0.0	0.5	Light brown silty sand with trace fill material (glass, brick)	D
				0.5	2.0	Orange to yellow fine to meduim grained sand; clean; native	D
				2.0		End of boring	

Notes and comments Moisture codes: D-dry, M-moist, W-wet, S-saturated

To limit cross-contamination with shallower fill material, deeper native soils were not disturbed during the test pit investigation.

Samples Collected

Time	Designation	Time	Designation

N:\Projects\NUS\112C01017_DelDOT Middletown_Landfill\Documents\Testpit logs

TETRA TECH - TEST PIT LOG

Project Name: St. Annes Church Road/Bridge I-503		Project No.:112C01017
Project Location:Middletown, Delaware		
Test Pit No.:3	Date Excavated: 10/23/2007	Inspector: Jason Daliessio
Contractor:Lewis Environmental	Excavation Method: Track Excavator	
Surface Elevation (ft):Unknown	Groundwater Depth (ft):	Total Depth (ft):8

		PID readings		Strata Depth (ft)			
Sample	Sample Depth (ft)	Depth (ft)	PPM	From	To	**Description of Materials**	Moisture
				0.0	2.0	Light brown silty sand with trace fill material (glass, brick)	D
				2.0	5.0	Rounded coarse gravels with trace fine-to-medium grained sands	D
				5.0	6.5	Rounded coarse gravels with trace fine-to-medium grained sands	D
						and black cobble (rounded coarse gravel conglomerates)	
				6.5	8.0	Light brown to orange fine-grained sand, clean, native	M
				8.0		End of boring	

Notes and comments Moisture codes: D-dry, M-moist, W-wet, S-saturated

Samples Collected

Time	Designation	Time	Designation